



# Test Report: WDR-240-24

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240W Single Output Industrial DIN RAIL Power Supply

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

**DESIGN VERIFY TEST**
**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 150 mVp-p (Max)	I/P : 400VAC O/P : FULL LOAD Ta : 25°C	V1 : 50 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 24 V ~ 28 V	I/P : 400 VAC I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	23.501 V ~ 28.739 V / 400 VAC 23.496 V ~ 28.734 V / 230 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1%~ -1% (Max)	I/P : 200 VAC / 550 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.2%~ -0.2%	P
4	LINE REGULATION	V1 : 0.5%~ -0.5% (Max)	I/P : 200 VAC ~ 550 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.03%~ -0.03%	P
5	LOAD REGULATION	V1 : 1%~ -1% (Max)	I/P : 400 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.2%~ -0.2%	P
6	SET UP TIME	400VAC : 1500 ms (Max) 230VAC : 3000 ms(Max)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 434 ms 230VAC/ 810 ms	P
7	RISE TIME	400VAC : 150 ms (Max) 230VAC : 150 ms (Max)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 44 ms 230VAC/ 57 ms	P
8	HOLD UP TIME	400VAC : 16 ms (TYP) 230VAC : 14 ms (TYP)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 22 ms 230VAC/ 20 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5%	P
10	DYNAMIC LOAD	V1 : 2400 mVp-p	I/P : 400 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1). 293 mVp-p (2). 903 mVp-p	P

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~550 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-3V= 177 V HIGH-LINE+10V=560 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE )	160 V~550V  TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 180 VAC ~ 550 VAC O/P : FULL -MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	91 % (TYP)	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	91.46 %	P
4	INPUT CURRENT	400V/ 1 A (TYP) 230V/ 2 A (TYP)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 0.76 A/ 400 VAC I = 1.30 A/ 230 VAC	P
5	INRUSH CURRENT	400V/ 50 A (TYP) COLD START	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	I = 46 A/ 400 VAC	P
6	LEAKAGE CURRENT	< 3.5 mA / 530 VAC	I/P : 530 VAC O/P : Min LOAD Ta : 25°C	L-FG : 1.1 mA N-FG : 1.1 mA	P
7	POWER FACTOR	0.84 / 400VAC(TYP) 0.84 / 230 VAC(TYP)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.857 / 400VAC PF= 0.859 / 230 VAC	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 130 %	I/P : 400 VAC I/P : 230 VAC O/P : TESTING Ta : 25°C	125.7 %/ 400 VAC 125.7 %/ 230 VAC Constant current limiting, unit will shut down after 3 sec. , auto-recovery after 1 minute if the fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 29- 33 V	I/P : 400 VAC I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	30.50 V/ 400 VAC 30.71 V/ 230 VAC Shut down o/p voltage,auto recovery after 1minute if the fault condition is removed.	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 90 ± 5°C O.T.P. NO DAMAGE	I/P : 400 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 550 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Constant current limiting, unit will shut down after 3 sec. ,	P

				auto-recovery after 1 minute if the fault condition is removed	
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## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DO OK RELAY CONTACT RAYINGS	60VDC/0.3A 、 30VDC/1A 、 30VAC/0.5A resistive load	I/P : 550 VAC O/P : FULL LOAD Ta : 25°C	OK	P

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q 6 Rated : STP50NF25 45A/250V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 247 V (2) 247 V (3) 231 V	P
2	Diode Peak Voltage	Q100 Rated : IRFB3307 130A/75V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 61.2 V (2) 10 V (3) 59.6 V	P
3	Input Capacitor Voltage	C 5 Rated : 470u/250V 105°C 22*40 MXG	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 213.66 V (2) 213.83 V (3) 213.79 V	P
4	Control IC Voltage Test	U900 Rated : L6599AD 8.85V~16V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 14.328 V (2) 14.339 V (3) 14.346 V	P
5	Power Transistor ( D to S) or (C to E) Peak Voltage	Q203 Rated : STW25N95K3 22A/950V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 928 V (2) 820 V (3) 860 V	P

**SAFETY & E.M.C. TEST**
**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 7.40 mA I/P-FG : 7.1 mA O/P-FG : 5.82 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C /70%RH	I/P-O/P : 15.9 GΩ I/P-FG : 4.99 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	13 mΩ	P
4	APPROVAL	TUV : Certificate NO : UL : File NO : E215312			P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 400 /240/220VAC 50HZ O/P : 100/75/50/25%LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 400 /230VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 400 /230VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																															
1.	THERMO TRACER TEST (ROOM AMBIENT)	MODEL: WDR-240-24	TEST CONDITION: 230 VAC FULL LOAD ROOM AMBIENT = 25 °C	<table border="1"> <thead> <tr> <th>Position</th> <th>Temp</th> <th>VERDICT</th> </tr> </thead> <tbody> <tr><td>p 1: 54.6°C 195x, 199y</td><td>P1 C105</td><td>54.6</td><td>PASS</td></tr> <tr><td>p 2: 60.6°C 203x, 170y</td><td>P2 Q101</td><td>60.6</td><td>PASS</td></tr> <tr><td>p 3: 58.2°C 209x, 89y</td><td>P3 C17</td><td>58.2</td><td>PASS</td></tr> <tr><td>p 4: 75.2°C 187x, 84y</td><td>P4 T1 I/P</td><td>75.2</td><td>PASS</td></tr> <tr><td>p 5: 50.9°C 147x, 149y</td><td>P5 C5</td><td>50.9</td><td>PASS</td></tr> <tr><td>p 6: 49.6°C 190x, 42y</td><td>P6 Q6</td><td>49.6</td><td>PASS</td></tr> <tr><td>p 7: 46.0°C 115x, 25y</td><td>P7 TSW</td><td>46</td><td>PASS</td></tr> <tr><td>p 8: 65.8°C 223x, 84y</td><td>P8 T10/P</td><td>65.8</td><td>PASS</td></tr> <tr><td>p 9: 60.8°C 162x, 111y</td><td>P9 TICORE</td><td>60.8</td><td>PASS</td></tr> <tr><td>p10: 68.4°C 224x, 122y</td><td></td><td></td><td></td></tr> <tr><td>p11:</td><td></td><td></td><td></td></tr> <tr><td>p12:</td><td></td><td></td><td></td></tr> <tr><td>p13:</td><td></td><td></td><td></td></tr> <tr><td>p14:</td><td></td><td></td><td></td></tr> <tr><td>p15:</td><td></td><td></td><td></td></tr> </tbody> </table>	Position	Temp	VERDICT	p 1: 54.6°C 195x, 199y	P1 C105	54.6	PASS	p 2: 60.6°C 203x, 170y	P2 Q101	60.6	PASS	p 3: 58.2°C 209x, 89y	P3 C17	58.2	PASS	p 4: 75.2°C 187x, 84y	P4 T1 I/P	75.2	PASS	p 5: 50.9°C 147x, 149y	P5 C5	50.9	PASS	p 6: 49.6°C 190x, 42y	P6 Q6	49.6	PASS	p 7: 46.0°C 115x, 25y	P7 TSW	46	PASS	p 8: 65.8°C 223x, 84y	P8 T10/P	65.8	PASS	p 9: 60.8°C 162x, 111y	P9 TICORE	60.8	PASS	p10: 68.4°C 224x, 122y				p11:				p12:				p13:				p14:				p15:				P																																
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2	TEMPERATURE RISE TEST	MODEL : WDR-240-24 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 400VAC O/P : FULL LOAD Ta=26.4°C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 400VAC O/P : FULL LOAD Ta=57.2 °C		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta=26.4 °C</th> <th>HIGH AMBIENT Ta=57.2 °C</th> </tr> </thead> <tbody> <tr><td>6</td><td>LF2</td><td>TR986</td><td>56.8°C</td><td>86.1°C</td></tr> <tr><td>7</td><td>C171</td><td>220u/16V UL8Kh 6.3*11 ZLH</td><td>59.7°C</td><td>88.4°C</td></tr> <tr><td>8</td><td>BD1</td><td>10A/1KV GLASS KBJ1010G</td><td>56.1°C</td><td>85.1°C</td></tr> <tr><td>9</td><td>Q203</td><td>STW25N95K3 22A/950V</td><td>64.5°C</td><td>95.4°C</td></tr> <tr><td>10</td><td>Q6</td><td>STP50NF25 45A/250V</td><td>61.6°C</td><td>91.8°C</td></tr> <tr><td>11</td><td>T1</td><td>TF2155</td><td>78.9°C</td><td>108.7°C</td></tr> <tr><td>12</td><td>L4</td><td>TR946</td><td>59.2°C</td><td>91.0°C</td></tr> <tr><td>13</td><td>L6</td><td>TR959</td><td>56.1°C</td><td>86.7°C</td></tr> <tr><td>14</td><td>C5</td><td>470u/250V 105°C 22*40 MXG</td><td>57.6°C</td><td>87.9°C</td></tr> <tr><td>15</td><td>C17</td><td>100u/50V UL7Kh 8*11.5 KY</td><td>69.6°C</td><td>98.7°C</td></tr> <tr><td>16</td><td>C151</td><td>330u/25V UL8Kh 8*11.5 ZLH</td><td>73.1°C</td><td>101.8°C</td></tr> <tr><td>17</td><td>C105</td><td>1500u/35V UL10Kh 12.5*30 ZLH</td><td>69.9°C</td><td>99.0°C</td></tr> <tr><td>18</td><td>U900</td><td>PWM L6599AD</td><td>70.5°C</td><td>101.2°C</td></tr> <tr><td>19</td><td>Q101</td><td>IRFB3207 180A/75V</td><td>74.9°C</td><td>105.6°C</td></tr> <tr><td>20</td><td>L101</td><td>TR974</td><td>65.2°C</td><td>94.9°C</td></tr> <tr><td>21</td><td>C120</td><td>330u/35V UL7Kh 10*16 KY</td><td>57.4°C</td><td>86.1°C</td></tr> <tr><td>22</td><td>TSW1</td><td>ST-22W-R0 90°C 60mm</td><td>57.4°C</td><td>87.0°C</td></tr> <tr><td>23</td><td>C33</td><td>10u/450V 105°C 10*20 PX</td><td>58.1°C</td><td>87.5°C</td></tr> </tbody> </table>	NO	Position	P/N	ROOM AMBIENT Ta=26.4 °C	HIGH AMBIENT Ta=57.2 °C	6	LF2	TR986	56.8°C	86.1°C	7	C171	220u/16V UL8Kh 6.3*11 ZLH	59.7°C	88.4°C	8	BD1	10A/1KV GLASS KBJ1010G	56.1°C	85.1°C	9	Q203	STW25N95K3 22A/950V	64.5°C	95.4°C	10	Q6	STP50NF25 45A/250V	61.6°C	91.8°C	11	T1	TF2155	78.9°C	108.7°C	12	L4	TR946	59.2°C	91.0°C	13	L6	TR959	56.1°C	86.7°C	14	C5	470u/250V 105°C 22*40 MXG	57.6°C	87.9°C	15	C17	100u/50V UL7Kh 8*11.5 KY	69.6°C	98.7°C	16	C151	330u/25V UL8Kh 8*11.5 ZLH	73.1°C	101.8°C	17	C105	1500u/35V UL10Kh 12.5*30 ZLH	69.9°C	99.0°C	18	U900	PWM L6599AD	70.5°C	101.2°C	19	Q101	IRFB3207 180A/75V	74.9°C	105.6°C	20	L101	TR974	65.2°C	94.9°C	21	C120	330u/35V UL7Kh 10*16 KY	57.4°C	86.1°C	22	TSW1	ST-22W-R0 90°C 60mm	57.4°C	87.0°C	23	C33	10u/450V 105°C 10*20 PX	58.1°C	87.5°C	P
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3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 400 VAC O/P : 115 % LOAD Ta : 25°C	TEST : OK	P																																																																																															
4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 550VAC/100VAC O/P : 100 % LOAD Ta= -30 °C	TEST : OK	P																																																																																															

5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 553 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P
6	TEMPERATURE COEFFICIENT	± 0.03 %(0-50°C)	I/P : 400 VAC O/P : FULL LOAD	± 0.004 %(0-50°C)	P
7	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	P
8.	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 400VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P
9	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
10	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 400VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 400VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME		(1) 154239 HRS (2) 30725 HRS (3) 53462 HRS	P
11	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 141.1 KHRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2010/10/21	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/11/25	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023